

CivilTech
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Non-Residential Depth-Damage Curves

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Categories Designated For Surveying *Residential*

- Apartments
- Mobile Homes

Categories Designated For Surveying *Non-Residential*

- Mobile Home Parks
- Schools (Elementary, Middle and High Schools)
- Hotel/Motel Low Rise
- Restaurant, table service
- Fast Food
- Bar/Lounge
- Auto Service Garage
- Neighborhood Shopping Center
- Strip Shopping Center
- Supermarket
- Convenience Store
- Medical Office
- Bank
- Office Building Low Rise
- Retail-Single Occupancy
- Warehouse, Office Warehouse, Warehouse, Prefab.
- Religious Facility
- Hospital

Number of Surveys Earmarked for Each Category

Description	Target Number		
	Structure	Content	Total
Apartments	50		50
Mobile Homes	50		50
Mobile Home Parks	10		10
Schools (Elementary, Middle and High Schools)	30		30
Hotel/ Motel Low Rise	6		6
Restaurant	6		6
Fast Food	7		7
Bar/ Lounge	10		10
Auto Service Garage	20		20
N. Shopping Center	2	20	22
Strip Shopping Center	5	25	30
Supermarket	4		4
Convenience Store	3		3
Medical Office	6		6
Bank	1		1
Office Building Low Rise	10	20	30
Retail-Single Occupancy	84		84
Warehouse	15	15	30
Religious Facility	25		25
Hospital	5		5
Totals	349	80	429

Survey Population Databases

Database	Source
2001 Certified Harris County Appraisal District (HCAD) Database	HCAD
Repetitive Loss Structures	FEMA
FEMA Insurance Claims Database for all of Harris County	FEMA
FEMA Disaster Assistance Database for all of Harris County	FEMA
List of Municipalities with flooding damage	FEMA

Distribution of Extracted

Land Use Code	Category	Records in Database
209	Apartments (4-9 Units)	73
211	Garden Apartments	18
612	Schools	4
108	Mobile Homes	326
213	Mobile Home Park	28
315	Hotel/ Motel Low Rise	23
321	Restaurant, table service	6
325	Fast Food	6
327	Bar/ Lounge	29
332	Auto Service Garage	51
343 & 374	Neighborhood Shopping Center	37
344	Strip Shopping Center	11
347	Supermarket	2
348	Convenience Store	7
349	Medical Office	18
351	Bank	0
353	Office Building Low Rise	26
373	Retail-Single Occupancy	118
397, 398, & 399	Warehouse, Office Warehouse, Warehouse, Prefab.	266
620	Religious Facility	133
640	Hospital	4
Totals		1,186

Contact Participation & Refusal Statistics

Total number of records extracted from FEMA database	1,186
Number of records for which telephone numbers were found from FEMA	433
Numbers from Houston Yellow Pages	139
Numbers from Internet Yellow Pages	309
Total Telephone Numbers for Survey	881

Contact Participation & Refusal Statistics

Number of Telephone Calls Made	881	100.00%
No Answers	213	24.20%
Refused to participate	117	13.30%
Business was Not Flooded	299	33.90%
Call Backs	36	4.10%
Family Residence	15	1.70%
Telephone Disconnected/ Invalid Number	72	8.20%
Not in Houston Area	14	1.60%
Left Message	7	0.80%
Fax	5	0.60%
Wrong Property Type	5	0.60%
Participants who agreed to schedule a face-face interview	98	11.10%

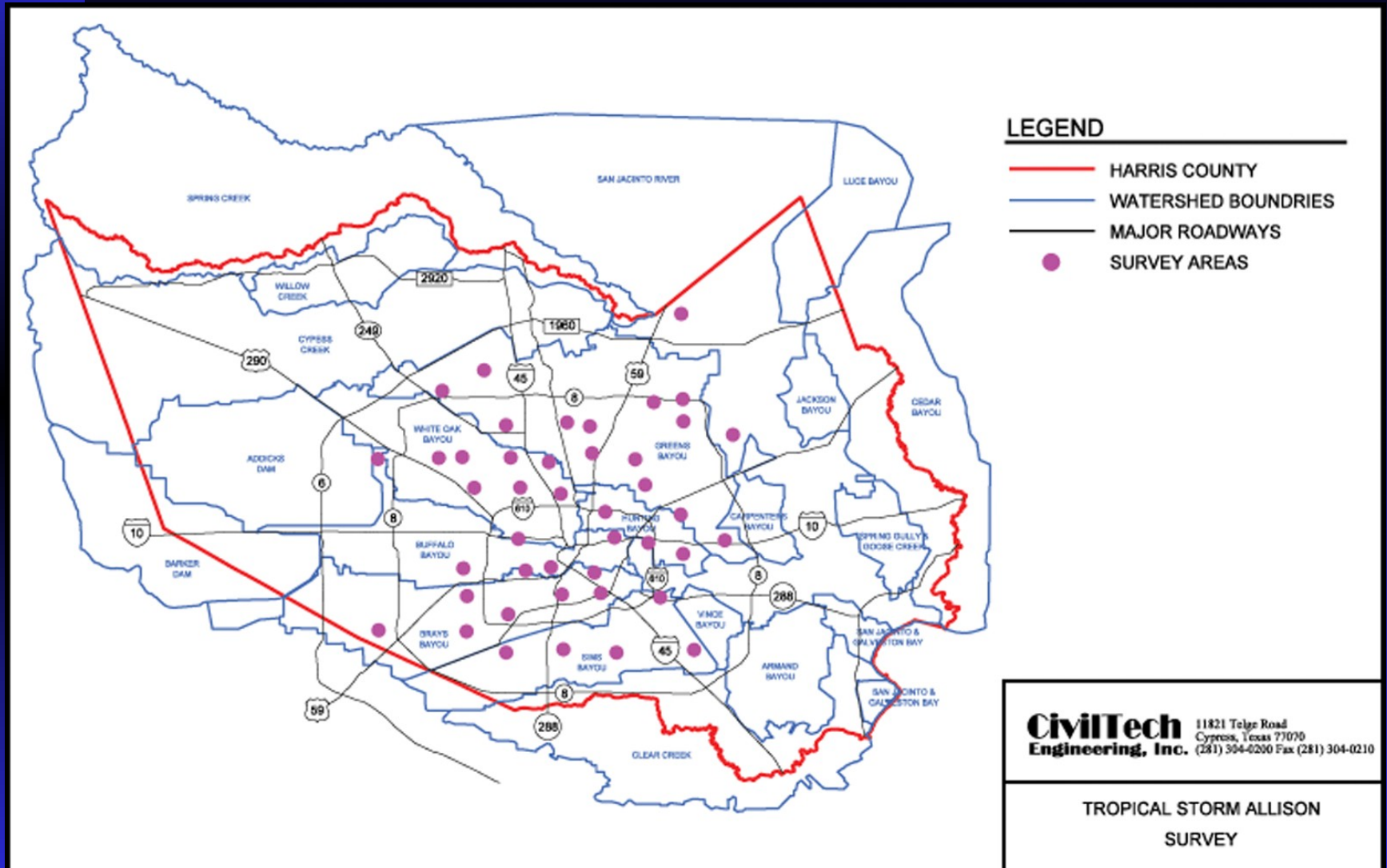
Final Residential Interview Completion Rates

	Surveys	Structures
Apartments	22	50
Mobile Homes	55	55
Mobile Home Parks	5	5
Total surveys completed		110

Final Non-Residential Interview Completion Rates

Surveys	
Businesses from the initial telephone list who participated in a face-to-face interview	66
Additional businesses surveyed by canvassing (in-person visits)	147
Total surveys completed	213

TS Allison Survey Map



In Conclusion

- Tropical Storm Allison provided a unique opportunity to gather data for a wide variety of structures and a wide range of flood depths.
- IWR with HCFCD sponsored a post flood damage survey
 - ◆ Objective: develop a national database of depth-damage relationships
- Structures surveyed
 - ◆ 105 residential
 - ◆ 248 non-residential

In Conclusion

- Many reported they did not receive ample warning
- Businesses flooded when closed, learned of flood afterward
- Flooded roads prevented business owners from taking measures to minimize damages

CivilTech Engineering, Inc.